VII. INPUT VALUES FOR OUTSIDE PLANT MUST REFLECT THE ACTUAL MATERIAL AND LABOR COSTS INCURRED. (Section III.C.2.g)

In the FNPRM, the Commission asks for comment on the input values for several elements of outside plant. The costs for installing and maintaining these network components varies significantly among carriers and areas served. A carrier-specific engineering model would reflect these differences. However, if the Commission adopts a cost proxy model, it should allow these outside plant costs to be variable inputs so that users can ensure that their costs are properly reflected.

A. The Hatfield Model and BCPM estimates of manhole cost installations do not account for all costs. (Section III.C.2.g.(1))

Noting that the manhole cost estimates in the Hatfield Model and BCPM are similar, the Commission requests comment on these input values.[50] GTE believes that the estimates used by both models do not fully account for all necessary costs. Because these costs vary significantly based on the population density and ground conditions of the areas being served, the Commission should allow carriers to use different input variables based on serving area costs.

The cost estimates for manholes used in the Hatfield Model are not indicative of forward-looking manhole costs. Indeed, the input values in the model are not even supported by the Hatfield Model's own source data. The input value used for materials in the Hatfield Model is $1,865.[51] A comparison of this value to the Hatfield source data

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[50] FNPRM, ¶ 105.

[51] Hatfield Inputs Portfolio 4.0, Section 3.6 (filed Aug. 1. 1997).

indicates that the Model developers chose the lowest price quotation received and ignored other bids that were significantly higher.[52] When the material price for a manhole is calculated using all of the bids received by the Hatfield Model developers for the Model 3.1 input value, calculations show that the average manhole material cost is $4,407 – a number far greater than that used in either Hatfield Model 3.1 or 4.0.[53] When this analysis is taken one step further to include all manhole-related costs, the Hatfield Model values of $5,140, 5,540 and $7,340 for rural, suburban, and urban areas grow to $6,830, $7,182, and $8,276, respectively if the average Hatfield Model source material is used. This is yet another instance in which the Hatfield Model developers "data shop" to achieve the desired result, regardless of actual costs.

B. The input values for poles, anchors, guys, aerial cable, and building attachments should be developed on a carrier- and location-specific basis. (Section III.C.2.g.(2))

The Commission requests comment on accurate input values for the forward-looking economic cost of materials and installation for poles.[54] The importance of using actual data is further emphasized by a comparison of pole costs in GTE's service territories. The cost of installed poles ranges from $354.00 to $451.00 depending upon

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[52] Public Version of the Rebuttal Testimony of Francis J. Murphy, Public Utilities Commission of the State of Hawaii, Docket No. 7702 at 28 (Aug. 28, 1997).

[53] *Id*. at 29.

[54] FNPRM, ¶ 110.

the state,[55] but when material loading factors are included the total price increases substantially. For example, the cost of a pole in Washington State is $737 when all labor materials and loadings are included. One of the main determinants in the fluctuation of these costs is the labor rate, which varies widely both among and within states. Pole installation costs also increase with more difficult terrain. The use of actual contractor costs from individual companies will capture these differences.

In contrast, the Hatfield Model's estimates of pole costs ignore these differences and consistently underestimate costs. When the source documentation purportedly used by the Hatfield Model for the development of pole costs is reviewed, it becomes clear that Hatfield Model proponents again rely only those sources that support a lower price. The independent data reviewed by the Hatfield Model developers shows an average pole cost of $301, yet the Model uses a value of only $201. Similarly, the total average pole investment calculated by the Hatfield Model engineering team is $522, yet the value used in the Model is $417.[56] In addition, the bids that the Hatfield Model does include only use portions of the bid prices while ignoring others. For instance, the Model developers used the cost of a pole of a certain vendor and totally disregarded the ten and fifteen percent overhead and profit factors that were part of the total price. They also chose material costs from one vendor and totally unrelated installation costs

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[55] GTE Response to Universal Service Data Request 10, CC Docket No. 96-45, DA 97-1433 (filed on computer diskette Aug. 15, 1997).

[56] Rebuttal Testimony of Francis J. Murphy, Public Utilities Commission of the State of Hawaii, Docket No. 7702 at 20 (Aug. 28, 1997). *See* detailed discussion in Section III, *infra*.

from another vendor.[57] As explained above, in the real-world, a carrier must use a contractor's entire bid and cannot select piecemeal from it. The Hatfield Model algorithm also fails to account for the increased costs of installing poles in difficult terrain. Similarly, BCPM uses $417 as the total aerial cost per pole, but this figure does not capture the full cost of materials and installation.[58]

The FNPRM also requests comment on the reasonableness of the types of materials used by BCPM and the Hatfield Model for poles.[59] Even though poles vary in size, there is not a great differential in price. The factors which primarily affect price are those such as climate and terrain. Actual material and installation decisions should be left to the LEC.

The Commission asks whether the selected cost proxy mechanism should identify separately costs for poles, guys, and anchors.[60] To ensure that all costs are properly accounted for, it is essential that costs be identified and estimated separately. For example, guys and anchors can be a significant portion of the costs of installing a pole. In fact, a bid included in a Hatfield Model source estimated the cost of guys and anchors to be an additional $292 per pole. The Hatfield Model's claim that the costs of guys and anchors are included in the labor rate is clearly inaccurate and results in an

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[57] *Id.* at 22.

[58] BCPM Model, Attachment 9 at 43 (Feb. 27, 1997).

[59] FNPRM, ¶¶ 110-111.

[60] FNPRM, ¶ 111.

underestimation of costs. For example, in California, the costs of anchors and guys range from $200 to $260 per pole.

The Commission tentatively concludes that the selected mechanism should include pole spacing input values.[61] As the Commission notes, BCPM and the Hatfield Model use similar input values which vary by area density. GTE believes that the BCPM values are more representative of actual pole spacing intervals currently in use.

The Commission requests comment on its tentative conclusion that the selected mechanism should include feeder and distribution cable costs for both wire and fiber and the forward-looking costs of such cable.[62] GTE agrees that the costs for feeder and distribution cable for both copper and fiber should be included. The cost estimates should separately identify the material, engineering, and installation components.

C. Fill factors included in a cost proxy model must allow sufficient growth to reflect good engineering practices. (Section III.C.2.g.(5))

A cable fill factor is the estimated percentage of cable capacity that will be used. The Commission asks for comment on what fill factors should be used to estimate this capacity.[63] The fill factors incorporated in a cost proxy model should be based on the actual network configuration that currently exists. Despite the Hatfield Model's

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[61] FNPRM, ¶ 112.

[62] FNPRM, ¶ 113.

[63] FNPRM, ¶ 119.

proponents' claims to the contrary, fill factors are unlikely to change with the advent of competition.

Companies engineer their networks to ensure that more plant is installed than is necessary at the time of installation. There are three main reasons for this. First, networks are designed to serve future capacity. For example, distribution cable facilities should be sufficient to meet the expected level of ultimate demand. It is more efficient to install distribution cable in this manner to avoid customer inconvenience and the significant expense of repeatedly digging up private property (or the public right-of-way) to accommodate growth.[64] Second, carriers must ensure that the network is reliable. This necessitates installing spare administrative cable so that when pairs become defective, the ILEC can quickly restore service.[65] Third, cable is sized in discrete increments. Distribution cable is typically sold in 25, 50, 100, 200, 300, 400, 600, 700, 1200, 1800, and 2400 pair increments. Therefore, an ILEC must often purchase cable that is larger than needed.

The Hatfield Model assumes unrealistic fill levels that would prohibit an ILEC from offering reliable service to its customers. For instance, the Hatfield Model assumes that fiber feeder cables have a 100 percent fill factor. No engineer or outside planner would ever construct a fiber plant in this manner because doing so would result in a network that was unable to handle short-term demand fluctuations. In addition,

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[64] Revised Direct Testimony of David Tucek, Washington Utilities and Transportation Commission, Docket Nos. UT-960369, 960370, 960371 at 38 (Apr. 18, 1997).

[65] *Id.*

such a design would leave an ILEC unable to respond to cable failures in a timely manner because insufficient spare capacity exist to transfer defective cables.

VIII. A COST PROXY MODEL MUST INCLUDE REALISTIC SWITCH CAPACITY LIMITATIONS. (Section III.C.3.b)

A. Switch capacity constraint limitations must take individual wire center characteristics into account.

Switch design is based on traffic theory. Not everyone can have a dial-tone simultaneously. If switches were designed to serve this total demand, the price of installing and maintaining the telephone network would be prohibitively high. Consequently, there must be a limit on the number of lines for which a dial tone is available at any given time. The measurement used for this limit is generally the line concentration ratio ("LCR"). The LCR specifies how many lines have access through the network at a given time. For example, a 6:1 LCR indicates that there is one virtually dedicated network path for every six lines. LCR is determined by the total demand (usage) of the central office. In rural areas, LCR can be somewhat higher than urban areas where relative usage is greater. Therefore, overall switch capacity is a function of lines and usage.

In the FNPRM, the Commission tentatively concludes "that the selected mechanisms should assign more than one switch to a wire center whenever the mechanism predicts that any one of a set of capacity constraints would be exceeded" and asks for comment on this conclusion.[66] As GTE explained in previous pleadings,

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[66] FNPRM, ¶ 124.

many factors contribute to determinations regarding switching capacity. The best method to determine the numbers of switches needed to serve a particular area is to use the actual switch deployment by ILECs. Use of the actual number and types of switches will ensure all of the factors taken into account by ILECs in determining the number of switches needed to serve a particular area are taken into account.[67]

B. The Hatfield Model includes unrealistic switch limitations and is internally inconsistent.

1. The Hatfield Model does not ensure adequate switching capacity to meet customer needs.

The Hatfield Model algorithm for determining switch capacity constraints is not based on real-world network capabilities and should not be relied upon by the Commission. The Hatfield Model uses a 90 percent processor occupancy threshold, which determines that an additional switch is needed for a wire center if the threshold of 720,000 busy hour call attempts ("BHCA") is exceeded.[68] To reach this threshold, every line in a particular state would have to generate nine call attempts in the busy hour because the Hatfield Model does not allow individual switch parameters to be modified individually. Use of this capacity limitation will not accurately measure when a new switch is necessary and will compromise network reliability. For example, call centers, telemarketing centers, and Internet providers are high volume switched traffic producers. A switch heavily loaded with these types of customers could exceed its

[67] *See* Comments of GTE Service Corporation, CC Docket Nos. 96-45, 97-160 at 8-9 (filed Aug. 18, 1997).

capacity limits. However, since the Hatfield Model only allows traffic variation at the state level, it would not predict that such a switch was over its capacity because each line in the state would not be generating nine call attempts in the busy hour.

Similarly, the Hatfield Model fails to account accurately for switch traffic. Switch capacity (traffic) is frequently measured in busy hour centum call seconds ("CCS"). The Hatfield Model sets a switch limit of 1,800,000 CCS that must be reached before additional switches are necessary. In order for a switch to meet this threshold under the Hatfield Model, every line in the network for an entire state would have to generate 22.5 CCS each during the busy hour (1,800,000 maximum CCS/80,000 maximum lines/switch = 22.5 CCS/line). Although the 22.5 CCS limit will likely never be reached for an entire state, individual wire centers may be receiving traffic significantly in excess of their capacity.[69] Using actual switch data will avoid these problems since ILECs always consider a variety of factors, including future growth, in switch capacity decisions. Because the Hatfield Model ignores the basic engineering practice of examining demand forecasts to determine the requirements for lines and trunks prior to installing switches, it consistently understates the investment in switching equipment needed to operate a reliable network.

(...Continued)

[68] This calculation is based on an assumption of 80,000 lines per switch.

[69] Internet access calls often generate 36 CCS because the calls remain connected for several hours. Areas with high concentrations of Internet users, and Internet Access Providers, can exceed switch CCS limitations but will be undetected by the Hatfield Model algorithm, which only looks at state-wide data.

2. The Hatfield Model switch capacity algorithm is internally inconsistent.

In addition to setting unreasonable limits for switching capacity, the Hatfield Model has internal inconsistencies which lead to understatements in switching costs. The Hatfield Model develops the line and trunk port costs associated with switching separately and then combines the two to develop the total switching costs. Unfortunately, the Model uses different ratios of lines to trunks in its calculations so that costs are computed for significantly fewer lines than are actually necessary to serve the customers in each state. The following Hatfield Model 4.0 calculations, based on information for GTE's service areas in California, provide a compelling example of the degree to which costs are understated:

Hatfield Model Trunk Port Costs for California:

$100 per trunk port[70] x 280,714 trunk ports[71] = $28,071,400

Hatfield Model Reduction in Line Cost to Account for Trunk Port Costs for California:

1. The Hatfield Model assumes a 6:1 line to trunk ratio for California and uses this ratio to reduce line costs

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[70] Although the input value in the Hatfield Model for trunk port investment per end is $100, this figure is not supported by the source evidence cited by the Model developers. The supporting documentation for this value is listed as the AT&T Capacity Cost Study and the judgment of Hatfield Associates. However, when this documentation is reviewed, the investment figure is $275 per port. The Model developers give no reasoning for this $175 difference per trunk port.

[71] The Hatfield Model assigns this number of trunk ports for California. Hatfield Model 4.0 Expense Output Report Unit Cost Spreadsheet, Produced from Release 4.0 at 2 (Aug. 1, 1997).

2. To estimate the trunk costs offset:

$100 per trunk port/6 =$16.67

3. $16.67 x # lines in California = $16.67 x 3,662,785

= $61,058,626 in total trunk offset

The problem with this calculation is that Hatfield Model assumes a 6:1 line-to-trunk ratio for costs when the line-to-trunk ratio actually produced by the Model in California is 13:1. The understatement of switch costs that results from the Hatfield Model's use of a 6:1 ratio rather than the 13:1 ratio is demonstrated below:

The Actual Line-To-Trunk Ratio in the Hatfield Model:

Lines in California/ # Trunks in California

or

3,662,785/280,714[72]= 13:1 Line-to-Trunk Ratio

The Switching Understatement Based on the Line-to-Trunk Ratio Actually Used in the Hatfield Model:

The 13:1 line-to-trunk ratio is used to calculate the trunk port costs

To estimate the Trunk port offset:

$100 per trunk port/13 =$7.70

$7.70 x # lines in California = $7.70 x 3,662,785

= $28,203,445 offset

The Shortfall in Switching Costs for GTE California:

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[72] *Id.*

The Hatfield Model predicts a trunk port offset for cost purposes using a 6:1 ratio of $61,058,626

The Hatfield Model predicts a trunk port offset for facilities purposes using a 13:1 ratio of $28,203,445

Switching shortfall in Hatfield Model $32,855,181[73]

The Hatfield Model's internal inconsistencies show a shortfall in costs of almost $33 million.

IX. SWITCHING COSTS SHOULD BE INCLUDED IN THE MODEL THROUGH USER-ADJUSTABLE INPUTS. (Section III.C.3.c)

The Commission tentatively concludes that it should incorporate the Commission staff's estimates of switching costs.[74] GTE disagrees. Switch costs vary among manufacturers and areas of the country. To ensure that the actual costs of switch equipment are accounted for, the selected mechanism should allow carriers to enter their switch costs through user-adjustable inputs.

The Commission also requests comment on whether the costs of growth lines should be incorporated into the switching cost estimates and how these costs should be determined.[75] GTE believes that they should. Telephone companies can negotiate large discounts for initial switch purchases because of competition among suppliers.

[73] This value was determined using Hatfield Model default values which GTE does not support. Use of actual trunk port costs in the Hatfield Model will produce even larger discrepancies.

[74] FNPRM, ¶ 132.

[75] FNPRM, ¶ 132.

However, once the switch has been purchased there is no competition for the remaining life of the switch for growth additions, since each switch technology is developed under proprietary specifications. Thus, the prices for growth lines tend to be higher on a per-line basis than the original switch.

In some cases, growth lines will be purchased regularly for each subsequent year while in other cases they will be needed only infrequently. To estimate the costs of growth lines, the degree of growth that will occur over the life of the switch must be estimated. This growth rate combined with the present value of the expected price for growth lines should be included in the current switch investment to determine the annual cost of providing switching.

GTE also notes that in addition to its many other inaccuracies, the Hatfield Model incorrectly includes a digital loop carrier ("DLC") offset input value. Telephone companies buy switching equipment capable of providing service to subscribers served either by analog signals from analog lines (copper cable) or digital signals over DLCs. The NBI study used by the Hatfield Model developers to establish the Model's switch cost function includes a weighted average price for the different types of switching equipment needed to serve each type of line. Therefore, the price differences between these types of equipment are already taken into account in the NBI study. Despite this fact, the Hatfield Model still includes a price offset for some equipment. The fact the Hatfield Model developers have altered the amount of the offset by a factor of six since the introduction of Model version 2.0 confirms that there is no foundation for this reduction. Indeed, in the Hatfield Model 4.0 Inputs Portfolio, the source of this reduction is listed as "a Hatfield Associates estimate."[76]

The offset used in the Model incorrectly reduces ILEC switch costs to account for the fact that DS-0 level line cards are not required in digital switches when integrated DLCs are used in the loop, because the switch can handle traffic at the DS-1 level. This reduction is set at $5.00 per line. Not only is this offset unnecessary (because cost differences are already taken into account by the NBI study), but also the offset should be replaced with a cost increase to account for additional switching investment required to implement the hairpinning arrangement the Hatfield Model contemplates for handing off unbundled integrated DLC loops to CLECs.

Moreover, it is questionable whether the unidentified switches referred to in the Hatfield Model actually contain line circuit cards that can be physically separated from the switch in the event they are not required. Nortel switches have separable line cards, but frames, cables, shelves, line drawers and other common equipment must be installed initially at a cost not captured in Hatfield Model calculations before single line augmentation can be accomplished. Lucent switches do not have separable line cards. In fact, Lucent switches require a minimum line purchase with costs that are also not reflected anywhere in the Hatfield Model. The Hatfield Model takes none of these issues into account when computing costs.

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[76] Cost Model Criteria Letter, Attachment "Hatfield Inputs Portfolio 4.0," Section 4.1.7.

X. PERCENT OF SWITCH ASSIGNED TO THE PORT AND PROVISION OF UNIVERSAL SERVICE (Section III.C.3.d)

The Commission requests comment on a number of issues regarding switching costs.[77] As GTE noted in its previous comments, most commenters support the Commission's proposal that the port and usage costs should be separated, with 100 percent of port costs being allocated to universal service, be adopted.[78] Most commenters also agreed that all usage costs relating to designated services should be attributed to universal service.[79] The Commission requested comment on the best method for determining what portion of the switch costs should be attributed to the port. GTE believes that Bellcore's Switching Cost Information System ("SCIS") is the most accurate method to make this determination because it is the most accurate method of allocating switch costs.[80]

XI. A COST PROXY MODEL SHOULD USE ACTUAL COSTS FOR INTEROFFICE TRUNKING, SIGNALING, AND LOCAL TANDEM INVESTMENT. (Section III.C.4)

The FNPRM states that the Hatfield Model can generate specific cost estimates for interoffice elements necessary to provide trunking, signaling, and local tandem

[77] FNPRM, ¶ 137.

[78] *See* Reply Comments of GTE Service Corporation, CC Docket Nos. 96-45, 97-160 at 9-10 (filed Aug. 18, 1997).

[79] *Id.*

[80] *Id.*

investment for local but not interexchange facilities.[81] Therefore, the Commission tentatively concluded that the Hatfield Model was "adequate" to determine these costs and requested comment on the accuracy of the Model's algorithm.[82] Because interoffice facilities ("IOF") issues relate to both platform design and input values, GTE provided a detailed analysis of this issue in its comments filed on August 8, 1997.[83] In that pleading, GTE demonstrated that the Hatfield Model's algorithm is fatally flawed and that the only accurate method to calculate transport costs is use of actual IOF and route distances.

To reiterate briefly, the Hatfield Model's method of calculating IOF routes and route distances is inconsistent with forward-looking switch designs and route designs. The Model's algorithm significantly understates interoffice route distances, associated structures, and the required quantities of certain IOF network components. Although a full description of the Model's flaws is provided in the comments referenced above, GTE notes a few of the most egregious problems here. The Hatfield Model's input values for interoffice trunking are clearly erroneous because they produce route to air ratios that are mathematically and physically impossible. In most states, when the IOF methodology in the Hatfield Model is used to calculate route to air ratios, the ratios are less than one. It is thus not surprising that regulators in New Mexico recently stated

[81] FNPRM, ¶ 141.

[82] FNPRM, ¶ 141.

[83] *See* Comments of GTE Service Corporation, CC Docket Nos. 96-45, 97-160 at 14-24, Attachments A and B (filed Aug. 8, 1997).

that "the [New Mexico] Commission finds that Hatfield Model 3.1 should not be used to establish the price of interoffice mileage related transport prices."[84]

The Hatfield Model also ignores basic engineering principles when constructing its IOF network. Standard engineering practices dictate that network capacity is designed to handle peak traffic loads with a small probability of blocking (*e.g.*, less than a one percent probability of blocking during the busiest hours of the busiest day).[85] The IOF network is subject to these same engineering practices for both carrying traffic to another office and to an interexchange carrier. The Hatfield Model ignores this and instead develops its own criteria by using a straight-line average[86] to size its IOF trunk network. This design produces a network that has insufficient IOF trunks and would cause unacceptably high levels of blocked calls.

Further, the default input value used by the Hatfield Model for IOF/feeder structure sharing is unrealistic The Hatfield Model assumes that 75 percent of the structure supporting interoffice transport facilities is shared with feeder facilities,[87] which is not accurate for much of the United States. For example, in the state of Hawaii, 50.5

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[84] New Mexico State Commission Findings of Fact, Conclusions of Law and Order, Docket No. 97-35-TC at ¶ 104 (Sept. 19, 1997).

[85] "An Update Study of AT&T's Competitors' Capacity To Absorb Rapid Demand Growth," Section 4.1 (Apr. 19, 1995), *cited in* Cost Model Criteria Letter, Attachment "Hatfield Inputs Portfolio 4.0." Section 2.2.2.

[86] The Hatfield Model's trunk sizing algorithm is based on a straight-line average of annual DEMs (dial equipment minute)*.

[87] Cost Model Criteria Letter, Attachment "Hatfield Inputs Portfolio 4.0," Appendix B, Section B118.

percent of IOF cable is underwater and cannot share the same structure with feeder cable. Similarly, in New Mexico, since some of GTE's service areas are not contiguous, it is unreasonable to assume that IOF and feeder will share the same structure 75 percent of the time. Because of these and other inaccuracies, GTE urges the Commission to ensure that any cost proxy model selected produces a functional network and captures the factors and conditions that impact the network on a daily basis.

XII. GENERAL SUPPORT FACILITIES ("GSF") INVESTMENT AND EXPENSES SHOULD DETERMINED USING ACTUAL COSTS. (Section III.C.5)

In the FNPRM, the Commission requests comment on the appropriate platform assumptions to compute GSF investment and expenses.[88] Rather than using a platform approach, the Commission should use the most recently available ARMIS data for individual companies. Those data provide a clear representation of the expenses associated with the provision of service. In deriving a factor for nationwide application, necessary adjustments can be made to reflect changes in such variables as inflation and productivity. The burden of supporting ARMIS account balances should be on the ILEC, but the ILEC should be allowed to reduce or increase balances upon presentation of supporting evidence.

[88] FNPRM, ¶ 148.

The Commission also asks whether GSF investment and expense would be more accurate if computed by tying the variable more closely to the cost of computers.[89] More accurate estimates cannot be derived by relying on fewer of the factors affecting expenses. The less actual company-specific cost data that are included in deriving GSF calculations, the more inaccurate the estimates become.

The Commission tentatively concludes that GSF expenses should vary by state based on differing land values.[90] GTE agrees. In addition to the costs of land, geographic, climatic, labor, regulatory, and other local factors affect GSF costs. Since these differences are reflected in ARMIS accounts, use of those data will improve GSF expense and investment estimates.

XIII. ILECS SHOULD BE ALLOWED TO USE ECONOMIC DEPRECIATION TO COMPUTE UNIVERSAL SERVICE EXPENSES. (Section III.C.6)

The Commission tentatively concludes that depreciation should be computed within the range currently specified in the Commission's rules and that depreciation expense should reflect a weighted average of the rates authorized for carriers required to submit their rates to the Commission.[91] GTE strongly disagrees. Because of the Commission's requirement that the cost model be forward-looking, economic life is the only appropriate measure for depreciation of ILECs' physical plant.

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[89] FNPRM, ¶ 148.

[90] FNPRM, ¶ 148.

[91] FNPRM, ¶ 152.

The current depreciation rates included in the Commission's rules are premised on a regulatory compact dependent upon a single telephone service provider. The rates are artificially long in order to keep depreciation expense, and thus customer rates, low. Under the regulatory compact, GTE was assured the opportunity for full recovery of all of its prudent investments over a Commission authorized period of time. These artificial depreciation schedules have resulted in ILECs' incurring considerable reserve deficits, including a $7.5 billion adjustment reserve for GTE.[92]

With the introduction of competition into the local market, recovery of investment is no longer guaranteed. ILECs must be allowed to use the same economic depreciation rates as other competing service providers, which is depreciation based on the economic life of the equipment. Forcing ILECs to continue using artificially low depreciation rates will cause them to continue to incur a depreciation reserve deficit and put them at a competitive disadvantage.

The Commission has stated that universal service support should be determined based on "the forward-looking cost of service calculated using a forward-looking cost methodology."[93] Existing, federally-prescribed depreciation rates are backward-looking, rather than forward-looking, and would underestimate the actual costs of providing service. Although the Commission has stated that it will initiate a proceeding to

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[92] As GTE has previously stated, the Commission must ensure that ILECs have an opportunity to recover their depreciation-related embedded costs through a charge independent of the universal service funding mechanism. *See, e.g.*, Comments of GTE Service Corporation, CC Docket Nos. 96-45, 97-160 at 5 (filed Aug. 8, 1997).

[93] FNPRM, ¶ 10.

consider changes to its depreciation rules,[94] possible relief at some time in the future is not a sufficient justification for using clearly inadequate depreciation rates in the universal service cost model. Depreciation rates based on economic life are well-known to all competitive firms and should be used to compute forward-looking universal service costs.

XIV. LOCAL USAGE SHOULD NOT BE CONSIDERED IN COMPUTING UNIVERSAL SERVICE COSTS. (Section IV)

In the FNPRM, the Commission tentatively concludes that definition of universal service should include a local usage component.[95] As GTE has explained previously, the information needed to include local usage is currently unavailable. Including local usage will require examining hundreds of local calling options to determine a common denominator to serve as the threshold to determine universal service costs. GTE has no studies which compute only local usage by customers. Not including local usage will also help equalize availability of universal service support between exchanges with disparate toll free local calling areas.

The difficulty of including local usage in the definition of universal service provides further support for GTE's position that wireless technologies should not be considered for universal service purposes until an auction mechanism is in place.[96]

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[94] FNPRM, ¶ 153.

[95] FNPRM, ¶ 178.

[96] *See* Comments of GTE Service Corporation, CC Docket Nos. 96-45, 97-160 at 14-16 (filed Sept. 24, 1997).

Usage costs are an extremely high percentage of wireless service costs. To ensure that customers would have affordable wireless local loop service, it is essential to have accurate estimates of average local service in each area. Until such estimates can be completed and an auction mechanism is in place, wireless technologies cannot be expected to provide customers with a substitute for wireline services.

XV. A TIME-SERIES FORECASTING MODEL SHOULD BE USED TO DETERMINE THE EXPENSES ASSOCIATED WITH PROVIDING UNIVERSAL SERVICE. (Section III.C.7)

In the FNPRM, the Commission asks a number of questions relating to the calculation of expenses incurred by carriers in the provision of universal service.[97] GTE suggests that information useful for the development of these expenses can be obtained from a time series forecasting model which estimates expense relationships empirically. GTE has developed such a model, which is described in detail in Appendix 1.

The expense model estimates the expenses reported by LECs through the ARMIS system, as a function of a set of relevant explanatory variables. The model is based on a pooled time series/cross section basis using six years of ARMIS data. The model estimates the total expense for each study area in each ARMIS account, but does not attempt to identify the portion of each expense account that is related to the provision of basic local service. The results of the model therefore cannot be used directly as the expense input into a universal service cost model.

[97] FNPRM, ¶¶ 155-171.

However, the model is still useful in addressing several important issues raised in the FNPRM with respect to expenses. The Commission has sought to develop expense estimates which are forward-looking. Various parties have represented to the Commission that adjustments should be made to observed expense levels to make them forward-looking, but little evidence has been provided to support any of the proposed adjustments. The empirical model described in Appendix 1 captures the effects of technological change and other factors which influence expenses over time. It will thus provide an empirically supported basis for estimating the relationship between currently observed expenses and forward-looking expenses.

This approach to estimating forward-looking expenses is also consistent with the Commission's existing policy on productivity offsets for price caps. In both cases, the problem is to estimate the extent to which costs will change in future periods. For price caps, the Commission based its estimate of the productivity offset on observation of the actual cost experience of price cap LECs during recent periods. The empirical model proposed here would estimate the expected change in expenses by applying well-accepted time series methods to observed ARMIS data from the past six years. It is reasonable to assume that the movement of total expenses in each account over time estimated by the model will also be representative of the movement of the portion of that expense that is attributable to basic local service.

In addition, the Commission asks whether expenses should be calculated on a per-line or per-investment basis.[98] GTE submits that neither approach is entirely

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[98] FNPRM, ¶ 162.

satisfactory on its own. The use of investment-driven factors, as in the Hatfield model, raises a number of concerns. First, most expenses are not driven by investment. Second, the calibration of any investment factors is complex. If investment factors are calculated by comparing current expenses with current investment, then if the model underestimates investment (as the Hatfield model does), it will also underestimate expenses. Third, if expenses are assigned to CBGs purely on the basis of investment, the distribution of expenses may be misrepresented. For example, the expense of billing a $100 loop will appear to be ten times as great as the expense of billing a $10 loop. On the other hand, some expenses, such as maintenance, may be correlated with variation in investment. This occurs not because investment drives maintenance expense, but because other factors, such as density and distance, affect both maintenance expense and investment.[99] The use of expense factors driven by the number of lines, as is done in BCPM, avoids the concerns listed above, but raises some different concerns. In particular, a constant per-line expense factor may fail to capture legitimate variations in expenses across areas.

GTE submits that the empirical evidence presented in Appendix 1 provides useful information which can be used to improve the expense estimates in a proxy model. As Appendix 1 shows, expenses are generally not driven by the level of

[99] In GTE's own cost model, some expenses are determined on the basis of investment-driven factors. However, care has been taken in the development of these models to minimize the concerns noted here. GTE is continuing its efforts to improve its methods for developing expense estimates. However, some of the study approaches are suitable for a carrier-specific model but are not feasible for use in a nationwide universal service model. The empirical model in Appendix 1 will improve expense estimates and can be readily applied on a nationwide basis.

investment. The model includes several explanatory variables, including variables which capture differences in both output and investment. Taken together, these explanatory variables account for 95 to 99 percent of the variation in expenses across study areas. While lines appear as explanatory variables in some of the equations, expenses are not generally simply a function of lines. In other words, the level of expense, measured on a per-line basis, varies across ARMIS reporting areas as a function of other variables.

GTE recommends that the empirical estimates presented in Appendix 1 be incorporated into the development of the expense factors to be used in the selected cost mechanism.[100] The expense factors in BCPM were developed based on data in the ARMIS expense accounts. Thus calculation reflects the proportion of each expense that is attributable to basic local service; it also reflects adjustments that make the expenses forward-looking. This process should be repeated to develop a per-line expense factor for each study area, using forecasted expenses from the empirical model, instead of the actual ARMIS expenses. The estimates would capture the effects of productivity and other factors which affect the expenses over time; the results would thus be forward-looking without the need for any further ex post adjustment. Because a separate factor would be developed for each study area, the effects of any other variables in the model which affect per-line expenses would also be captured. This

[100] Because GTE recommends that the Hatfield model should not be chosen, GTE will discuss its recommendation with respect to expenses as it would apply to the BCPM model.